

# « The impact of the identification of GSIBs on their business model »

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# Outline

- I. **Motivation and regulatory context**
- II. **Dataset description**
- III. **Econometric specification and results**

# I - Motivation and regulatory context

## “Too-big-to-fail” banks

- TBTF category of banks identified since 1984 in the USA
- 15<sup>th</sup> September 2008 :



## Ending “Too-big-to-fail”

- Pittsburg Summit in 2009: G20 objective to reduce “too-big-to-fail” (TBTF) problem
- Identification of the global systemically important banks (GSIBs) by international regulators started in 2011, with implications for further regulatory requirements



# I - Motivation and regulatory context

## Designation of GSIBs by the BCBS and FSB

### ➤ Annual update of the FSB's list of GSIBs

Bucket <sup>10</sup>	G-SIBs in alphabetical order within each bucket
5 (3.5%)	(Empty)
4 (2.5%)	Citigroup JP Morgan Chase
3 (2.0%)	Bank of America BNP Paribas Deutsche Bank HSBC
2 (1.5%)	Barclays Credit Suisse Goldman Sachs Industrial and Commercial Bank of China Limited Mitsubishi UFJ FG Wells Fargo
1 (1.0%)	Agricultural Bank of China Bank of China Bank of New York Mellon China Construction Bank Groupe BPCE Groupe Crédit Agricole ING Bank Mizuho FG Morgan Stanley Nordea Royal Bank of Scotland Santander Société Générale Standard Chartered State Street Sumitomo Mitsui FG UBS Unicredit Group

Source : FSB, *Update of group of global systemically important banks (GSIBs)*, 2016

### ➤ GSIB reform agenda

- Additional capital buffers (on a risk-adjusted and risk-unadjusted basis)
- Minimum TLAC
- Resolution planning (cross-border supervisory colleges and further resolution planning)
- Additional data collection / reporting (FSB Datagaps)
- Specific market discipline

➤ Ever since, the systemic risk in the banking system has been of renewed interest for practitioners, supervisory authorities and of course for the academic literature.

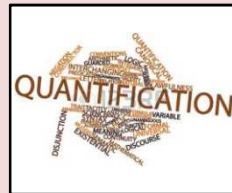
# I - Motivation and regulatory context

## Existing academic literature on systemic risk in the banking system



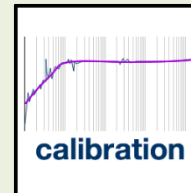
### Analysis of adverse incentives related to the status of TBTF

- *Flannery and Sorescu (1996)*
- *Freixas et al. (2004)*
- *Brandao Marques et al. (2013)*
- *Gropp et al. (2013)*



### Quantification of banks' systemic footprint

- Based on market info**
- *Systemic Expected Shortfall : Acharya et al. (2017)*
  - *SRISK: Acharya, Engle and Richardson (2012), Brownlees and Engle (2015)*
  - *CoVaR: Adrian and Brunnermeier (2016)*
- Improvement of current BCBS methodology**
- *Benoit, Hurlin and Pérignon (2016)*



### Analysis of optimal calibration of capital requirements

- *Bulow and Klemperer (2013)*
- *Sarin and Summers (2016)*
- *Passmore and von Hafften (FED, 2017)*



### Ending "too-big-to-fail"

- Evaluating implicit guarantees for GSIBs**
- *Moeninghoff et al. (2015)*
  - *Schich and Toader (2016)*
- Discussion papers**
- *FSB, BoE, OECD*
  - *Cecchetti and Schoenholtz (2017)*

# I - Motivation and regulatory context

## Our paper

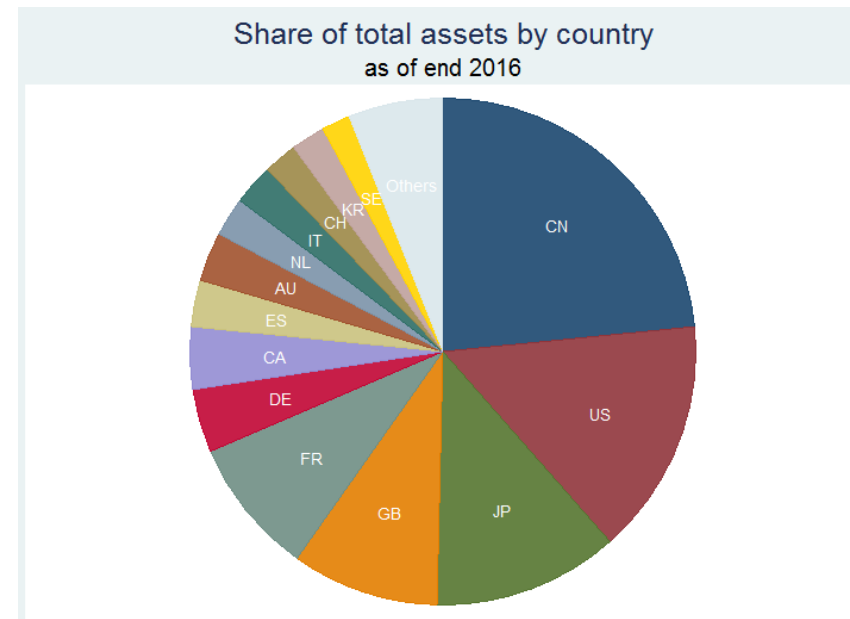
### But what is the impact of the designation itself and the following regulatory reforms on GSIBs' business model ?

- *NB: by “business model” we refer to balance sheet composition, revenue composition, profitability patterns, etc.*
- **Assess thoroughly the recent evolutions of the business models of such systemic banks :**
  - Are there any regulatory driven changes in terms of credit supply to the economy, profitability and risk-taking?
  - Are such changes consistent with the regulators expectations or are there any other unintended consequence of the designation of GSIBs?
- **Our paper falls within the stream of literature trying to assess whether G20 reforms are achieving their intended outcomes : *ex-post* evaluation**
- **This empirical investigation is solely based on publicly disclosed data.**

## II - Dataset description

### Data used in the paper

- 97 large banks with total assets > € 200 bn
- 22 countries
- Highest level of consolidation
- Frequency : annual
- Time span : 2005 - 2016
- Data retrieved from SNL database (accounting data)



## II - Dataset description

### Data used in the paper

TABLE 1 - List of dependent variables

Set of variables	Variable code	Variable description	Obs.	Mean
Balance sheet and prudential ratios	TA gr	Total Assets (TA) Growth Rate (gr)	1023	8.94%
	T1 gr	Tier 1 capital (T1) Growth Rate (gr)	886	13.94%
	T1 / TA	Tier 1 Capital over Total Assets ("leverage ratio")	990	5.09%
	T1 / RWA	Tier 1 Capital over RWA (solvency ratio)	972	11.72%
	CASH CB / TA	Cash and Balances with Central Banks over TA	681	5.97%
	LOANS CUST / TA	Net Loans to Non-Financial Customers over TA	681	51.61%
	SUB DEBT / TL	Total Subordinated Debt over Total liabilities	679	1.84%
Profitability, risk-taking and yield ratios	NET PROF / OP INC	Net Profit over Operating Income	663	23.99%
	ROA	Return on average assets	1037	0.66%
	ROE	Return on average equity	1017	10.50%
	RWA Density	Total RWA over Total Assets	1000	47.40%
	NPL / LOANS	Share of NPL over Total Loans	1003	2.73%
	LOAN YIELD	Total Loans Yield	686	5.22%
	DEP COST	Total Deposits Interest Cost	686	2.00%
	NIM	Net Interest Margin	686	2.16%

Table 3 - Set of country-specific macroeconomic control variables  $C_{k,t}$

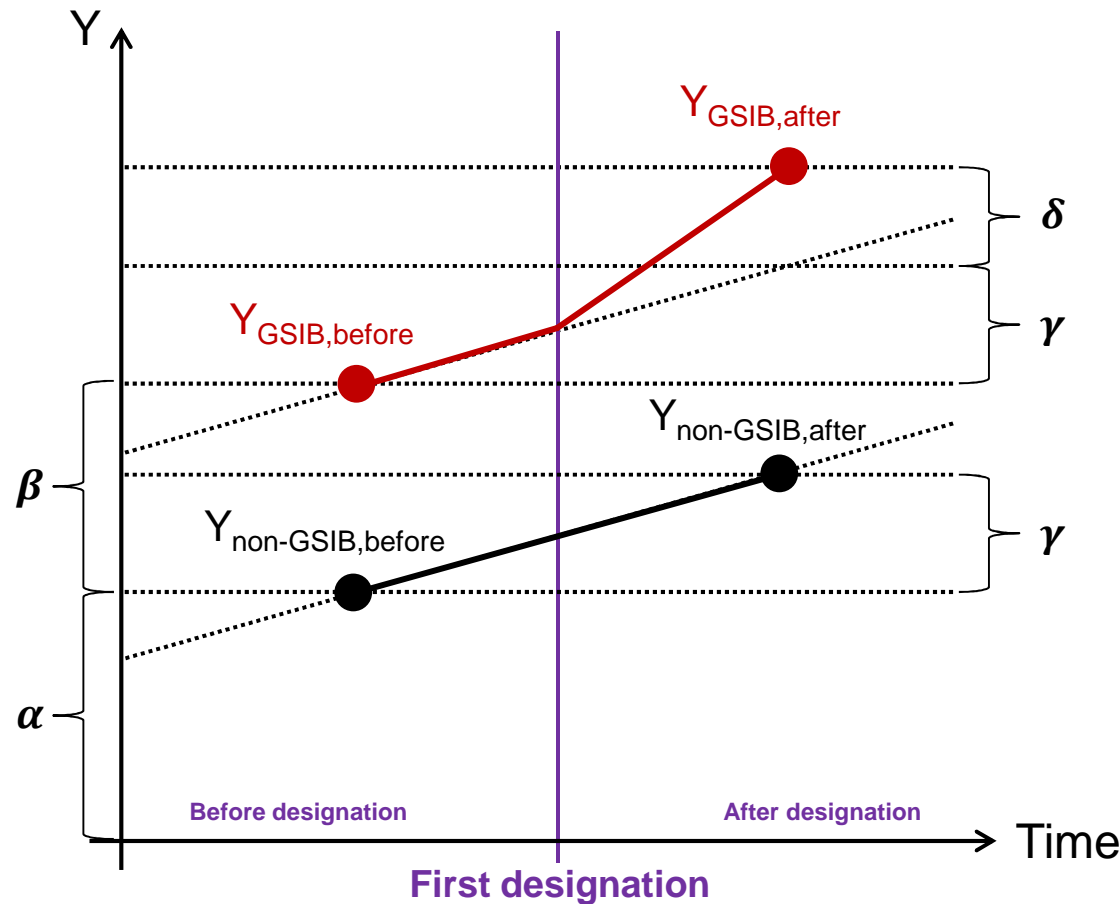
Variable code	Variable description
GDP gr	Real GDP Growth (%)
GDPperCap	GDP per Capita
UR	Unemployment Rate (%)
INFL	Inflation (%)
PUBD / GDP	Public Debt / GDP (%)
DOMCRED gr	Domestic Credit Growth (%)
SOVYIELD	10-year sovereign debt yield (%)
FX RATE gr	Annual growth rate of exchange rate against Euro (%)



# III – Econometric specification and results

## Econometric specification

$$Y_{i,k,t} = \alpha + \beta \cdot GSIB_{i,k} + \gamma \cdot Post2011_t + \delta \cdot (GSIB_{i,k} \times Post2011_t) + \varphi \cdot B_{i,k,t} + \chi \cdot C_{k,t} + PTH_t + u_{i,k,t}$$



- $\beta$  captures structural differences between the two groups (GSIBs vs. Non-GSIBs)
- $\gamma$  captures structural differences between the two periods (“industry trends”)
- $\delta$  captures the remaining impact of the designation on GSIBs, taking into account the two types of structural differences

# III – Econometric specification and results

## Regression results

<i>Figures in percentage points (pp)</i>	Dependent variable
$\beta$ ) GSIB	
( $\gamma$ ) Post2011	
( $\delta$ ) <b>GSIB <math>\times</math> Post2011</b>	
Obs.	
adj-R <sup>2</sup>	
Bank control var.	
Macro control var.	

Significance levels : \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$  - *Standard deviations in brackets*

# III – Econometric specification and results

## Regression results

<i>Figures in percentage points (pp)</i>	Dependent variable
	TA gr
$\beta$ ) GSIB	0.177 (1.605)
( $\gamma$ ) Post2011	-1.651** (0.834)
( $\delta$ ) GSIB $\times$ Post2011	<b>-5.763***</b> (1.392)
Obs.	1,023
adj-R <sup>2</sup>	0.333
Bank control var.	YES
Macro control var.	YES

Significance levels : \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$  - Standard deviations in brackets

# III – Econometric specification and results

## Regression results

<i>Figures in percentage points (pp)</i>	Dependent variable	
	TA gr	T1 /TA
$\beta$ ) GSIB	0.177 (1.605)	<b>-0.907**</b> (0.375)
$(\gamma)$ Post2011	-1.651** (0.834)	<b>0.509***</b> (0.107)
$(\delta)$ <b>GSIB <math>\times</math> Post2011</b>	<b>-5.763***</b> (1.392)	<b>0.589***</b> (0.200)
Obs.	1,023	946
adj-R <sup>2</sup>	0.333	0.227
Bank control var.	YES	YES
Macro control var.	YES	YES

Significance levels : \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$  - *Standard deviations in brackets*

# III – Econometric specification and results

## Regression results

<i>Figures in percentage points (pp)</i>	Dependent variable		
	TA gr	T1 /TA	T1 /RWA
$\beta$ ) GSIB	0.177 (1.605)	-0.907** (0.375)	-0.748 (0.922)
$(\gamma)$ Post2011	-1.651** (0.834)	0.509*** (0.107)	1.974*** (0.451)
$(\delta)$ GSIB $\times$ Post2011	<b>-5.763***</b> (1.392)	<b>0.589***</b> (0.200)	<b>-0.133</b> (0.569)
Obs.	1,023	946	930
adj-R <sup>2</sup>	0.333	0.227	0.383
Bank control var.	YES	YES	YES
Macro control var.	YES	YES	YES

Significance levels : \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$  - Standard deviations in brackets

# III – Econometric specification and results

## Regression results

<i>Figures in percentage points (pp)</i>	Dependent variable			
	TA gr	T1 /TA	T1 /RWA	Loans /TA
$\beta$ ) GSIB	0.177 (1.605)	-0.907** (0.375)	-0.748 (0.922)	-4.475 (4.137)
( $\gamma$ ) Post2011	-1.651** (0.834)	0.509*** (0.107)	1.974*** (0.451)	3.555*** (1.160)
( $\delta$ ) GSIB $\times$ Post2011	<b>-5.763***</b> (1.392)	<b>0.589***</b> (0.200)	<b>-0.133</b> (0.569)	<b>-1.120</b> (1.545)
Obs.	1,023	946	930	681
adj-R <sup>2</sup>	0.333	0.227	0.383	0.103
Bank control var.	YES	YES	YES	YES
Macro control var.	YES	YES	YES	YES

Significance levels : \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$  - Standard deviations in brackets

# III – Econometric specification and results

## Regression results

<i>Figures in percentage points (pp)</i>	Dependent variable				
	TA gr	T1 /TA	T1 /RWA	Loans /TA	ROA
$\beta$ ) GSIB	0.177 (1.605)	-0.907** (0.375)	-0.748 (0.922)	-4.475 (4.137)	-0.024 (0.093)
( $\gamma$ ) Post2011	-1.651** (0.834)	0.509*** (0.107)	1.974*** (0.451)	3.555*** (1.160)	0.157*** (0.042)
( $\delta$ ) GSIB $\times$ Post2011	<b>-5.763***</b> (1.392)	<b>0.589***</b> (0.200)	<b>-0.133</b> (0.569)	<b>-1.120</b> (1.545)	<b>-0.074</b> (0.053)
Obs.	1,023	946	930	681	1,026
adj-R <sup>2</sup>	0.333	0.227	0.383	0.103	0.404
Bank control var.	YES	YES	YES	YES	YES
Macro control var.	YES	YES	YES	YES	YES

Significance levels : \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$  - Standard deviations in brackets

# III – Econometric specification and results

## Regression results

<i>Figures in percentage points (pp)</i>	Dependent variable					
	TA gr	T1 /TA	T1 /RWA	Loans /TA	ROA	ROE
$\beta$ ) GSIB	0.177 (1.605)	-0.907** (0.375)	-0.748 (0.922)	-4.475 (4.137)	-0.024 (0.093)	1.782 (1.566)
( $\gamma$ ) Post2011	-1.651** (0.834)	0.509*** (0.107)	1.974*** (0.451)	3.555*** (1.160)	0.157*** (0.042)	1.853** (0.790)
( $\delta$ ) GSIB $\times$ Post2011	<b>-5.763***</b> (1.392)	<b>0.589***</b> (0.200)	<b>-0.133</b> (0.569)	<b>-1.120</b> (1.545)	<b>-0.074</b> (0.053)	<b>-3.064***</b> (1.056)
Obs.	1,023	946	930	681	1,026	1,007
adj-R <sup>2</sup>	0.333	0.227	0.383	0.103	0.404	0.364
Bank control var.	YES	YES	YES	YES	YES	YES
Macro control var.	YES	YES	YES	YES	YES	YES

Significance levels : \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$  - Standard deviations in brackets



# III – Econometric specification and results

## Regression results

<i>Figures in percentage points (pp)</i>	Dependent variable					
	TA gr	T1 /TA	T1 /RWA	Loans /TA	ROA	ROE
$\beta$ ) GSIB	0.177 (1.605)	-0.907** (0.375)	-0.748 (0.922)	-4.475 (4.137)	-0.024 (0.093)	1.782 (1.566)
$(\gamma)$ Post2011	-1.651** (0.834)	0.509*** (0.107)	1.974*** (0.451)	3.555*** (1.160)	0.157*** (0.042)	1.853** (0.790)
$(\delta)$ GSIB $\times$ Post2011	<b>-5.763***</b> (1.392)	<b>0.589***</b> (0.200)	<b>-0.133</b> (0.569)	<b>-1.120</b> (1.545)	<b>-0.074</b> (0.053)	<b>-3.064***</b> (1.056)
Obs.	1,023	946	930	681	1,026	1,007
adj-R <sup>2</sup>	0.333	0.227	0.383	0.103	0.404	0.364
Bank control var.	YES	YES	YES	YES	YES	YES
Macro control var.	YES	YES	YES	YES	YES	YES

Significance levels : \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$  - Standard deviations in brackets

$$ROE = \frac{R}{TE} = \frac{R}{TA} \times \frac{TA}{TE} = ROA \times \frac{1}{LR} \Rightarrow ROA \times \frac{1}{\overrightarrow{LR}} = \overrightarrow{ROE}$$

# III – Econometric specification and results

## Regression results

Figures in percentage points (pp)	Dependent variable						
	TA gr	T1 /TA	T1 /RWA	Loans /TA	ROA	ROE	RWA Density
$\beta$ ) GSIB	0.177 (1.605)	-0.907** (0.375)	-0.748 (0.922)	-4.475 (4.137)	-0.024 (0.093)	1.782 (1.566)	-3.784 (3.615)
$(\gamma)$ Post2011	-1.651** (0.834)	0.509*** (0.107)	1.974*** (0.451)	3.555*** (1.160)	0.157*** (0.042)	1.853** (0.790)	-2.714** (1.256)
$(\delta)$ GSIB $\times$ Post2011	<b>-5.763***</b> (1.392)	<b>0.589***</b> (0.200)	<b>-0.133</b> (0.569)	<b>-1.120</b> (1.545)	<b>-0.074</b> (0.053)	<b>-3.064***</b> (1.056)	<b>4.609***</b> (1.432)
Obs.	1,023	946	930	681	1,026	1,007	994
adj-R <sup>2</sup>	0.333	0.227	0.383	0.103	0.404	0.364	0.364
Bank control var.	YES	YES	YES	YES	YES	YES	YES
Macro control var.	YES	YES	YES	YES	YES	YES	YES

Significance levels : \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$  - Standard deviations in brackets

$$ROE = \frac{R}{TE} = \frac{R}{TA} \times \frac{TA}{TE} = ROA \times \frac{1}{LR} \Rightarrow ROA \times \frac{1}{\uparrow LR} = \downarrow ROE$$

# III – Econometric specification and results

## Regression results

<i>Figures in percentage points (pp)</i>	Dependent variable							
	TA gr	T1 /TA	T1 /RWA	Loans /TA	ROA	ROE	RWA Density	NPL /Loans
$\beta$ ) GSIB	0.177 (1.605)	-0.907** (0.375)	-0.748 (0.922)	-4.475 (4.137)	-0.024 (0.093)	1.782 (1.566)	-3.784 (3.615)	0.737 (0.692)
$(\gamma)$ Post2011	-1.651** (0.834)	0.509*** (0.107)	1.974*** (0.451)	3.555*** (1.160)	0.157*** (0.042)	1.853** (0.790)	-2.714** (1.256)	0.154 (0.242)
$(\delta)$ GSIB $\times$ Post2011	<b>-5.763***</b> (1.392)	<b>0.589***</b> (0.200)	<b>-0.133</b> (0.569)	<b>-1.120</b> (1.545)	<b>-0.074</b> (0.053)	<b>-3.064***</b> (1.056)	<b>4.609***</b> (1.432)	<b>-0.675*</b> (0.348)
Obs.	1,023	946	930	681	1,026	1,007	994	998
adj-R <sup>2</sup>	0.333	0.227	0.383	0.103	0.404	0.364	0.364	0.204
Bank control var.	YES	YES	YES	YES	YES	YES	YES	YES
Macro control var.	YES	YES	YES	YES	YES	YES	YES	YES

Significance levels : \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$  - Standard deviations in brackets

$$ROE = \frac{R}{TE} = \frac{R}{TA} \times \frac{TA}{TE} = ROA \times \frac{1}{LR} \Rightarrow ROA \times \frac{1}{\uparrow LR} = \downarrow ROE$$

# III – Econometric specification and results

## Regression results

Figures in percentage points (pp)	Dependent variable							
	TA gr	T1 /TA	T1 /RWA	Loans /TA	ROA	ROE	RWA Density	NPL /Loans
$\beta$ ) GSIB	0.177 (1.605)	-0.907** (0.375)	-0.748 (0.922)	-4.475 (4.137)	-0.024 (0.093)	1.782 (1.566)	-3.784 (3.615)	0.737 (0.692)
$(\gamma)$ Post2011	-1.651** (0.834)	0.509*** (0.107)	1.974*** (0.451)	3.555*** (1.160)	0.157*** (0.042)	1.853** (0.790)	-2.714** (1.256)	0.154 (0.242)
$(\delta)$ GSIB $\times$ Post2011	<b>-5.763***</b> (1.392)	<b>0.589***</b> (0.200)	<b>-0.133</b> (0.569)	<b>-1.120</b> (1.545)	<b>-0.074</b> (0.053)	<b>-3.064***</b> (1.056)	<b>4.609***</b> (1.432)	<b>-0.675*</b> (0.348)
Obs.	1,023	946	930	681	1,026	1,007	994	998
adj-R <sup>2</sup>	0.333	0.227	0.383	0.103	0.404	0.364	0.364	0.204
Bank control var.	YES	YES	YES	YES	YES	YES	YES	YES
Macro control var.	YES	YES	YES	YES	YES	YES	YES	YES

Significance levels : \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$  - Standard deviations in brackets

$$ROE = \frac{R}{TE} = \frac{R}{TA} \times \frac{TA}{TE} = ROA \times \frac{1}{LR} \Rightarrow ROA \times \frac{1}{\overrightarrow{LR}} = \overrightarrow{ROE}$$

$$\frac{T1}{RWA} = \frac{T1}{TA} \times \frac{TA}{RWA} = LR \times \frac{1}{RWA dens} \Rightarrow \overrightarrow{LR} \times \frac{1}{\overrightarrow{RWA dens}} = \left( \frac{\overrightarrow{T1}}{RWA} \right)$$

# III – Econometric specification and results

## Regression results

Figures in percentage points (pp)	Dependent variable								
	TA gr	T1 /TA	T1 /RWA	Loans /TA	ROA	ROE	RWA Density	NPL /Loans	Dep Cost
$\beta$ ) GSIB	0.177 (1.605)	-0.907** (0.375)	-0.748 (0.922)	-4.475 (4.137)	-0.024 (0.093)	1.782 (1.566)	-3.784 (3.615)	0.737 (0.692)	-0.418** (0.193)
( $\gamma$ ) Post2011	-1.651** (0.834)	0.509*** (0.107)	1.974*** (0.451)	3.555*** (1.160)	0.157*** (0.042)	1.853** (0.790)	-2.714** (1.256)	0.154 (0.242)	-0.122 (0.120)
$(\delta)$ GSIB $\times$ Post2011	<b>-5.763***</b> (1.392)	<b>0.589***</b> (0.200)	<b>-0.133</b> (0.569)	<b>-1.120</b> (1.545)	<b>-0.074</b> (0.053)	<b>-3.064***</b> (1.056)	<b>4.609***</b> (1.432)	<b>-0.675*</b> (0.348)	<b>0.086</b> (0.138)
Obs.	1,023	946	930	681	1,026	1,007	994	998	686
adj-R <sup>2</sup>	0.333	0.227	0.383	0.103	0.404	0.364	0.364	0.204	0.729
Bank control var.	YES	YES	YES	YES	YES	YES	YES	YES	YES
Macro control var.	YES	YES	YES	YES	YES	YES	YES	YES	YES

Significance levels : \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$  - Standard deviations in brackets

$$ROE = \frac{R}{TE} = \frac{R}{TA} \times \frac{TA}{TE} = ROA \times \frac{1}{LR} \Rightarrow ROA \times \frac{1}{\overrightarrow{LR}} = \overrightarrow{ROE}$$

$$\frac{T1}{RWA} = \frac{T1}{TA} \times \frac{TA}{RWA} = LR \times \frac{1}{RWA dens} \Rightarrow \overrightarrow{LR} \times \frac{1}{\overrightarrow{RWA dens}} = \left( \frac{\overrightarrow{T1}}{RWA} \right)$$

# III – Econometric specification and results

## Robustness checks

- Using alternative starting dates of “designation”, ranging from 2010 to 2014



- Using alternative definitions of the "GSIB" sub-group



- Using the GSIB buffer rate in the specification instead of the GSIB dummy

$$Y_{i,k,t} = \alpha + \beta \cdot GSIB_{i,k} + \gamma \cdot Post2011_t + \delta \cdot (Buffer_{i,k} \times Post2011_t) + \varphi \cdot B_{i,k,t} + \theta \cdot C_{k,t} + u_{i,k,t}$$



- Using country fixed effects instead of macroeconomic control variables

$$Y_{i,k,t} = \alpha + \beta \cdot GSIB_{i,k} + \gamma \cdot Post2011_t + \delta \cdot (GSIB_{i,k} \times Post2011_t) + \varphi \cdot B_{i,k,t} + \theta \cdot FE_k + u_{i,k,t}$$



- Using double country fixed effects before and after the financial crisis

$$Y_{i,k,t} = \alpha + \beta \cdot GSIB_{i,k} + \gamma \cdot Post2011_t + \delta \cdot (GSIB_{i,k} \times Post2011_t) + \varphi \cdot B_{i,k,t} + \theta_1 \cdot FE_{k,(2005-2007)} + \theta_2 \cdot FE_{k,(2008-2016)} + u_{i,k,t}$$



- Using a time dummy variable for the financial crisis in 2008 and 2009







$$Y_{i,k,t} = \alpha + \beta \cdot GSIB_{i,k} + \gamma \cdot Post2011_t + \delta \cdot (GSIB_{i,k} \times Post2011_t) + \varphi \cdot B_{i,k,t} + \theta \cdot C_{k,t} + \lambda \cdot Crisis_t + u_{i,k,t}$$



# Concluding remarks

## Key takeaways

- We find that the GSIB regulation, starting with FSB designation of GSIBs, had the following effects:

- ❖ Very significant slowdown in the expansion of their balance sheet   $TA\ gr$
- ❖ Additional improvement of their leverage ratio   $LR$
- ❖ No major impact on the composition of assets and liabilities   $Assets/Liab.$
- ❖ No impact on their return on assets   $ROA$
- ❖ "Mechanical" negative impact on their return on equity   $ROE$
- ❖ Their RWA density incurred a significant increase   $\frac{RWA}{TA}$

- **GSIBs often catch up with other banks levels.** The Basel III regulatory framework exerted a "mean-reverting" pressure on some business model characteristics for which a structural gap was noticed between GSIBs and non-GSIBs

- **Higher capital requirements did not affect banks' ability to provide loans to the economy.**

**Thank you for your attention !**